AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning on page 1, line 17 with the following amended paragraph:

2. Related ~~Arts~~ Art:

Please replace the paragraph beginning on page 1, line 26 with the following amended paragraph:

However, since there is a case where noises equivalent to the overcurrent occur, malfunctions due to such noises must be prevented and ~~thus accelerating the protection circuit has limits~~. On this account, cutting off the IGBT at high speed ~~has been difficult~~ while retaining a malfunction withstand capacity ~~of the malfunctions~~ is difficult.

Please replace the paragraph beginning on page 2, line 12 with the following amended paragraph:

~~For a purpose to solve these problems, there is a~~ A semiconductor switching element driving circuit that solves the above problems is described in ~~the publication of the~~ Japanese Patent Laid-Open Application No. 64707/1997. The semiconductor switching element driving circuit described in this publication is shown in FIG. 11.

Please replace the paragraph beginning on page 4, line 2 with the following amended paragraph:

In case that the conventional semiconductor switching element driving circuit is applied to such a motor driving circuit, as for the overcurrent caused by the motor lock or

the like, the IGBT 101 is cut off at high speed by the operation set forth and a flow through the IGBT 101 can be prevented. However, as for the short circuit current caused by the load short circuit or the arm short circuit described above, the condenser 105 for the removal of the noises prevents an instantaneous response. ~~and the~~ Thus, the flow of the short circuit current through the IGBT 101 cannot be prevented. Furthermore, the short circuit current flowing at this time increases to a huge magnitude (five-fold or more of a rated current, for example) because a motor driving voltage is enormously high. Consequently, there is a problem that the IGBT might be ~~broken~~ damaged.

Please replace the paragraph beginning on page 4, line 23 with the following amended paragraph:

In ~~the~~ light of the points as set forth, the purpose of the invention is to provide a semiconductor switching element driving circuit capable of controlling the overcurrent that increases instantaneously and of conducting the high-speed cutoff of the semiconductor switching element particularly in a device which high voltages are required.

Please replace the paragraph beginning on page 6, line 19 with the following amended paragraph:

For example, as shown in claim 2, the overcurrent limiting circuit may reduce the voltage of the gate terminal in the case that it becomes ~~said~~ a larger current within a shorter period of time than a delay time in the circuit.

Please replace the paragraph beginning on page 11, line 4 with the following amended paragraph:

FIG. 6 is a diagram depicting an equivalent circuit of the IGBT shown in FIGS. 5A and 5B~~.~~;

Please replace the paragraph beginning on page 14, line 17 with the following amended paragraph:

When an overcurrent that ~~becomes enormously large~~ rapidly increases in a relatively short time is about to ~~flows~~ flow though the IGBT 4, a voltage at the interconnection between sense resistors 11 and 12 becomes equal to a predetermined base-emitter voltage Vbe of the overcurrent limiting transistor 13 to turn on the overcurrent limiting transistor 13. In other words, when the collector current Ic has reached an i1 (a first comparison current) shown in a mathematical expression 1 and shown in FIG. 2A, the overcurrent limiting transistor 13 is turned on by a divided voltage applied with the sense resistors 11 and 12.

Please replace the paragraph beginning on page 20, line 11 with the following amended paragraph:

Additionally, since the IGBT 4 is cut off at the high speed when the collector current Ic becomes equal to or ~~under~~ less than the current i3 regardless of the period of time after the overcurrent has occurred, the overcurrent does not inevitably ~~flows~~ flow for a fixed time and the overcurrent can be prevented from being fed to the other IGBTs 4.

Please replace the paragraph beginning on page 21, line 20 with the following amended paragraph:

After all, the circuit shown in FIG. 1 can respond ~~to the~~ both ~~cases that~~ when the overcurrent becomes large enormously for a relatively short time and ~~that~~ when the overcurrent is generated for a relatively long time. In any ~~cases~~ case, the IGBT 4 can be prevented from being carried through the overcurrent that can ~~break~~ damage the IGBT.

Please replace the paragraph beginning on page 26, line 13 with the following amended paragraph:

The IGBT 4 expressed by this equivalent circuit connects an IGBT α to an IGBT β substantially in parallel. ~~Two of them have~~ Each of these IGBTs has a different threshold voltage Vt. As shown in a Vg-Ic characteristics in FIG. 7, a characteristics of the IGBT 4 ~~is~~ are expressed as a solid line $\alpha+\beta$. That is, a combination of characteristics in the IGBT α and the IGBT β becomes the characteristics of the IGBT 4. The characteristics of the IGBT 4 ~~has more~~ are gentler than ~~that~~ those of, for example, a ~~planer type~~ planar-type IGBT in which each cell has a same threshold voltage Vt. On this account, the Vce-Ic based on Vg characteristics of the IGBT 4 is expressed as FIG. 8, the Ic shifts and rises in two stages with respect to the Vce.

Please replace the paragraph beginning on page 27, line 25 with the following amended paragraph:

The IGBT 4 in the embodiment has different carrier densities in a region located on both sides of a trench in a p-type base layer, i.e. in a region where the channel is

formed, whereby a different threshold voltage Vt of the channel is formed on the both sides of the trench. The IGBT 4 of such a configuration is formed by conducting an ion implantation obliquely with respect to a surface parallel with a surface of the substrate 30 for adjusting the threshold voltage Vt as depicted by arrows in FIG. ~~10(b)~~ 10B and performing the ion implantation only on one side of the trench.

Please replace the paragraph beginning on page 28, line 14 with the following amended paragraph:

In the embodiments described above, although the delay time in the circuit is formed by the delay circuit 22, the delay time is formed inevitably without actually disposing the delay circuit 22 ~~actually~~. In this case, when the delay time inherent in the circuit is formed as long as a period of time not causing the malfunctions due to the noises equivalent to the overcurrent, the delay circuit 22 is not ~~necessarily~~ necessary.

Please replace the paragraph beginning on page 28, line 22 with the following amended paragraph:

In the fourth and fifth embodiments described above, although a trench-type IGBT (MOS) having the hexagonal cells or the striped cells ~~are~~ is shown in FIGS. 5A and 10A, the same effect can also be obtained by a planar-type MOS having hexagonal cells. Even a conventional ~~planer-type~~ planar-type MOS may be configured to have two kinds of Vts, α and β in FIG. 6, when ions are implanted into channel regions on a half of cells by using a mask.

Please replace the paragraph beginning on page 30, line 21 with the following amended paragraph:

However, when the gate voltage becomes greater, the voltage generated at sense terminal 4d also becomes greater. Therefore, the voltage between the gate and the sense terminal 4d decreases and thus the sub IGBT current reduces. In other words, as shown in FIG. 14, the greater the gate voltage becomes, the smaller the sub IGBT current becomes ~~respective~~ relative to the main IGBT current. As a result, the current mirror ratio becomes great according to the gate voltage.

Please replace the paragraph beginning on page 36, line 9 with the following amended paragraph:

On this account, the current carrying through the IGBT 51 is monitored by detecting the sub current Is with the two current detection resistors R1 and R2~~,~~.

Please replace the paragraph beginning on page 38, line 5 with the following amended paragraph:

In the second switching transistor Tr2, a base is connected to the collector of the first switching transistor Tr1, an emitter is connected to the negative electrode side of the battery 52 and a collector is ~~connecter~~ connected to a connecting point of the two current detection resistors R1 and R2. The second switching transistor Tr2 is not turned on because its base voltage is low when the first switching transistor Tr1 is on, while the second switching transistor Tr2 is turned on when the first switching transistor Tr1 is off.

Please replace the paragraph beginning on page 40, line 18 with the following amended paragraph:

On the other hand, while the IGBT 51 is being turned on or off and the gate voltage Vge is equal to or under the predetermined threshold value Vbor, the voltage drop by the gate voltage detection resistor R3 (the base voltage of the first switching transistor Tr1) does not ~~satisfies~~ satisfy the voltage required to turn on the first switching transistor Tr1 and thus the first switching transistor Tr1 is turned off.

Please replace the paragraph beginning on page 42, line 16 with the following amended paragraph:

As described above, in the load drive driving arrangement of this embodiment, when the gate voltage Vge is equal to or under the predetermined threshold value Vbor (when the current mirror ratio is small), the base voltage of the gate control transistor Tr3 becomes the voltage drop by the current detection resistor R2. Thus, even if the current mirror ratio is small and the ratio of the sub current Is to the main current is great, the gate control transistor Tr3 is not turned on immediately. Therefore, the protection is not more than ~~requires~~ required.

Please replace the paragraph beginning on page 42, line 26 with the following amended paragraph:

On the other hand, when the gate voltage Vge is greater than the predetermined threshold value Vbor (when the current mirror ratio is great), the base voltage of the gate control transistor Tr3 becomes the voltage drop by the current detection resistors R1 and R2 . Thus, even if the current mirror ratio is great and the ratio of the sub current Is to the main current is small, the IGBT 51 is surely protected when the main current exceeds a value to be limited. Therefore, in the case that the sub current Is does not become so large ~~great so much~~ regardless of the main current being the overcurrent, ~~the~~ protection can surely be conducted.

Please replace the paragraph beginning on page 44, line 6 with the following amended paragraph:

Consequently, there is no concern ~~such~~ that the protecting operation is conducted before the current carrying through the IGBT 51 satisfies the rated value of the IGBT 51 or such that the protecting operation is not conducted in spite of carrying the excess current caused the destruction of the IGBT 51. Therefore, ~~an~~ current-carrying during ~~a~~ normality and the protecting operation during the abnormality can be set at the proper current values in accordance with a magnitude of the gate voltage Vge.

Please replace the paragraph beginning on page 44, line 16 with the following amended paragraph:

Additionally, the gate voltage Vge is detected by the two current detection resistors R3 and R4. When the gate voltage Vge is equal to or under the threshold value Vbor, the voltage drop by the gate voltage detection resistor R3 (the base voltage of the first switching transistor Tr1) becomes smaller than the voltage required to turn on the first switching transistor Tr1. Consequently, the second switching transistor Tr2 is turned on as well as the first switching transistor Tr1 is turned off, whereby the current detection resistor R1 is short-circuited. Thus, ~~it becomes able surly to be conducted to~~ short-circuiting of the current detection resistor R1 is enabled. Moreover, the resistance value of the current detection resistor can surely be set according to the gate voltage Vge.